April 3, 1969

Dr. Martin Kaplan
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Dear Martin:

Thank you for your letter of March 27 and for the background material on CW (Perry Robinson, SIPRI).

1. I would caution against attempting to make very much of a case against BW on the grounds of effects on the gene pool. The same kinds of hazards pertain to BW agents as to those involved in natural epidemics, and it would be a vulnerable extrapolation to suggest large scale changes in human genotype from such infections. However, the incorproation of viral genomes, like SV-40, into human chromosomes can scarcely be discounted, and this risk is one of many reasons why we should discourage any large scale distribution of a virus without perfect understanding of it. However, exactly the same argument can be made for caution in vaccination!

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The main effect on the gene pool from BW will arise from its selective application to certain classes of human beings as compared to others. Since this is in general the object of warfare, there is not much point in stressing it in relation to BW.

The same arguments might, in general, be applied to CW, except for the growing interest in incapacitating, non-lethal weapons. LSD, which belongs in this category, is certainly at least under suspicion as a mutagenic chemical, although I am personally rather skeptical of the evidence that has been presented so far. Basically, the argument is the same as for the distribution of any drug.

These issues seem to me so ancillary that they would weaken rather than support the major basis of concern about the proliferation of these forms of warfare.

2. I would stress the very great importance of careful distinction between chemical and biological weapons. Chemical weapons are in general much closer to prevailing methods of warfare, and my main objection to them is mainly on the general premise that they make it increasingly easier for smaller, factional, irresponsible groups to perpetrate major mischief. I do not see how either chemical or biological weapons contribute very much to the strategic power of any of the great nations, nor significantly alter the balance of that power. Putting a lot of stress on chemical weaponry

will probably serve mainly to stir up more propaganda of a highly contentious kind about the American use of tear gas and similar agents in Viet Nam, and merely delay the possibility of a general agreement. I do not suggest that chemical warfare be excluded from the discussion, and the United States should take responsibility for its actions in this sphere, but I do stress that it would be unfortunate if a controversy in this area were to cloud the discussion of another problem, biological warfare.

If you do want to speculate abbut genetic possibilities, one can look forward to the unhappy likelihood that chemical agents will be found that can have a selective genocidal effect; for example, will be lethal or not, depending in part on skin pigmentation or other racial genetic factors. However, I am unaware that anyone is thinking in this direction, and I would suggest not planting such ideas in anyone's head. (The same potential, of course, exists for viral agents.)

3. The crucial hazard of biological warfare development is that it gives even further leverage to irresponsible use and that there is every expectation that if it is ever effective at all, it will spread beyond the theater of application. In this sense, a BW attack anywhere in the world is an attack on all humanity. Furthermore, the development of specific biological agents opens the possibility of recombination with other pathogens along lines that I am sure you have already thought about.

There is another kind of proliferation, on a psychological plane, namely that development work perceived as BW in any country results in an overall escalation throughout the world of interest in this area.

Finally, I will mention to you the horrible thought that this psychological escalation will also extend to a very considerable outbreak of domestic sabotage. Here again is an area that should perhaps not be publicized for fear of inspiring the all too many psychotics that we harbor among us.

The strengthening of techniques for the detection and identification of either chemical or biological attack is a reasonable answer to many of these concerns. I hope that one of the tangible outcomes of current discussions will be the cooperation of many, if not all, nations for the establishment of an open, international research center for defense of the species against attacks with either chemical or biological agents. It will already be a great step forward if we could secure a moral commitment from the participating powers to contribute to the operations of such a center. Connected with this, it would be a very useful step if the pwoers could declare their abhorrence of any use of biological weapons in war, and indicate that they would give their full support to any country subjected to this form of attack. These proposals would be similar to the corresponding commitments underlying the nuclear non-proliferation treaty.

These remarks are a preliminary statement, and if I have time, I will try to collect them in more detail before your meeting. Meantime, if you have any other documents on which I could comment, please send them to me.

4. There is an important genetic angle in connection with the use of biological or, for that matter,chemical attacks on food crops. One of the capricious by-products of the introduction of new, high-yield varieties -- like IR-8 rice -- is their exquisite vulnerability to specffic pathogens. The very genetic homogeneity of such a crop makes it more liable to specific forms of attack. If this is perceived by the developing countries, it will simply be one more obstacle in the introduction of the agricultural technology which is absolutely essential to feed the world population. (You will note in this connection Chandler's article in Science

5. Along some of the lines of your ecological argument one should posit as a hazardous side-effect of any development and use of novel biological agents a range of possibilities of spread. These are not necessarily confined to an acute outbreak in man. We might also have to contemplate the possibility of adaptation of pathogens to new vectors -- visualize malaria in the mosquitoes of New Jersey! Or hepatitis or plague in domestic cats!

Sincerely yours,

Joshua Lederberg
Professor of Genetics